(1) oscillates, moving back and forth between the first position and the second position, driven by air supplied through an air supply passage (13) to the cylinder (9). Li discloses at least one electric coil (7) placed to enclose changing magnetic flux caused by the magnetic moment associated with the piston (1) whereby an emf is generated in the electric coil (7), so that an external circuit connected to the electric coil (7) receives electric power from the electric coil (7). Li discloses that the means (4,6) engaging the piston (1) for biasing the piston (1) from the second position toward the first position is a compression spring (4,6) disposed between a piston extension (14) and an end enclosure (11).

Li discloses a cylinder extension (11) at least one of formed integrally with and attached to the cylinder (1), the cylinder extension (11) having an inner surface having a transverse dimension greater than a transverse dimension of the cylinder, the cylinder extension (11) having an end closure. Li discloses a piston extension (14) at least one of formed integrally with and attached to the piston (1), at least a portion of the piston extension (14) contacting at least a portion of cylinder extension (11) to provide positional constraint to the piston (1).

Li discloses that the portion of the piston extension (14) contacting at least a portion of the cylinder extension (11) is an outer surface of the piston extension (14) and the portion of the cylinder extension (11) is an inner surface of the cylinder

extension (11). Li discloses that the magnetic moment associated with the piston (1) is provided by a magnet attached to at least one of the piston (1) and the piston extension (14). Li discloses that the magnetic moment associated with the piston (1) is provided by forming at least one of the piston (1) and the piston extension (14) of a material having a magnetic moment.

However, Li does not disclose a cylinder having a first end connectable through an inlet flow path to an air supply passage containing air at a positive pressure, a second end of the cylinder being open. Li does not disclose that the piston is also positionable in a second location wherein the first portion of the piston is outside of the cylinder so that the clearance is provided between the piston and the cylinder so that air may exhaust from the cylinder. Li does not disclose a first cylinder having a first end connectable through a first inlet flow path to an air supply passage, a second end of the second cylinder being open. Li does not disclose a second cylinder having a first end connectable through a second inlet flow path to the air supply passage, a second end of the second cylinder being open.

Li does not disclose that the piston is positionable in a first location wherein the first end portion of the piston is disposed within the first cylinder and the second end portion of the piston is disposed outside of the second cylinder. Li does not disclose that the piston is positionable in a second location wherein the second end portion of the piston is disposed within the second cylinder and the first portion of the piston is

outside of the first cylinder. Li does not disclose that when the piston is disposed in the first position, air pressure received in the first cylinder through the first inlet flow path drives the piston toward the second position, whereupon the first cylinder exhausts, and when the piston is disposed in the second position, air pressure received in the second cylinder through the second inlet flow path drives the piston toward the first position, whereupon the second cylinder exhausts, so that the piston oscillates.

Li does not disclose sealing means disposed on at least one of an outer surface of the first portion of the piston and an inner surface of the cylinder to prevent loss of air between the piston and the cylinder and permit air pressure in the cylinder to increase when the first portion of the piston is disposed within the cylinder. Li does not disclose that the sealing means is an O-ring in a groove formed on the outer surface of the first portion of the piston. Li does not disclose that the inlet flow path includes an electrically actuated shutoff valve to prevent air flow through the generator, thereby turning off the generator. Li does not disclose that the at least one electric coil is connected to a rectifier to supply DC electric power. Li does not disclose that the rectifier is a full bridge rectifier to supply DC electric power whenever a net flux through the at least one electric coil is changing.

Oudet et al. disclose a pneumatic device (figure 5) comprising:

A cylinder (70) having a first end (75) connectable through an inlet flow pat (80) to an air supply passage containing air at a positive pressure, a second end of the cylinder (70) being open (91, 93). Oudet et al. disclose a piston (56) having a magnetic moment associated therewith, the piston (56) being positionable in a first location wherein at least a first portion of the piston (56) is disposed within the cylinder (70). Oudet et al. disclose that the piston (56) also being positionable in a second location wherein the first portion of the piston (56) is outside of the cylinder (70). Oudet et al. disclose that clearance is provided between the piston (56) and the cylinder (70) so that air may exhaust from the cylinder (column 8, lines 48 to 58). Oudet et al. disclose means (52) engaging the piston (56) for biasing the piston (56) from the second position toward the first position so that after the cylinder (70) has substantially exhausted, the piston (56) moves to the first position, whereby the piston (56) oscillates, moving back and forth between the first position and the second position, driven by air supplied through such air supply passage to the cylinder (70).

Oudet et al. disclose at least one electric coil (100, 101) placed to enclose changing magnetic flux caused by the magnetic moment associated with the piston (56) whereby an emf is generated in the electric coil (100, 101), so that an external circuit connected to the electric coil (100, 101) receives electric power from the electric coil (100,101). Oudet et al. disclose that the means (52) engaging the piston (56) for biasing

the piston (56) from the second position to the first position is a spring (52). Oudet et al. disclose a first cylinder (70) having a first end (75) connectable through a first inlet flow path (80) to an air supply passage, a second end of the first cylinder (70) being open (91, 93). Oudet et al. disclose a second cylinder (71) having a first end (76) connectable through a second inlet flowpath (82) to the air supply passable, a second end of the second cylinder (71) being open (90, 92).

Oudet et al. disclose a piston (56) having a magnetic moment associated therewith, the piston (56) having a first end portion and a second end portion, the piston (56) being positionable in a first location wherein the first end portion of the piston (56) is disposed within the first cylinder (70) and the second end portion of the piston (56) is disposed outside of the second cylinder (71). Oudet et al. disclose that the piston (56) is further positionable in a second location wherein the second end portion of the piston (56) is disposed within the second cylinder (71) and the first portion of the piston (56) is outside of the first cylinder (70). Oudet et al. disclose that when the piston (56) is disposed in the first position, air pressure received in the first cylinder (70) through the first inlet flowpath (80) drives the piston (56) toward the second position, whereupon the first cylinder (70) exhausts, and when the piston (56) is disposed in the second position, air pressure received in the second cylinder (71) through the second inlet flow path (82) drives the piston (56) towards the first position, whereupon the

second cylinder (82) exhausts, so that the piston (56) oscillates (column 8, lines 48 to 58).

Oudet et al. disclose at least one electric coil (100, 101) placed to enclose changing magnetic flux caused by the magnetic moment associated with the piston (56) whereby an emf is generated in the electric coil (100, 101), so that an external circuit connected to the electric coil (100, 101) receives electric power from the electric coil (100, 101). Oudet et al. disclose that the actuator further includes a spring (51, 52) engaging the piston (56) to bias the piston (56) toward one of the first position and the second position to facilitate starting the generator when air is supplied through the first air supply passage (80) and the second air supply passage (82). The invention of Oudet et al. has the purpose of generating a force by means of significant applied electric power and having optimal space requirements.

Carroll discloses sealing means (79, 80) disposed on at least one of an outer surface of the first portion of the piston (70) and an inner surface (65) of the cylinder. Carroll discloses that the sealing means (79, 80) is an O-ring inserted in a groove formed on the outer surface of the first portion of the piston (70). Carroll's invention has the purpose of avoiding escape of air between the piston and the cylinder.

It would have been obvious at the time the invention was made to modify the electromagnetic actuator of Li and provide it with the cylinder, inlet flow paths, piston, springs, electric

coils, and sealing means configurations disclosed by Oudet et al. and Carroll for the purpose of having optimal space requirements and avoiding escape of air between the piston and the cylinder.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the piston type control valve disclose by Li with an electric actuated shutoff valve, since the examiner takes Official Notice of the equivalence of the electric actuated shutoff valve and the piston type control valve for their use in the electric generator structure art and the selection of any of these known equivalents to prevent air flow through the generator would be within the level of ordinary skill in the art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the electric coil to a full bridge rectifier since it was known in the art that the full bridge rectifier is used to supply DC electric power whenever a net flux through the coils is changing.

2. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Fiegel et al. (U.S. Pat. No. 5,826,952).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that the inlet flow path includes an air filter for excluding foreign material from the cylinder.

Feigel et al. disclose that the inlet flow path (33) includes an air filter (62) to exclude foreign material from the cylinder for the purpose of prevent the ingress of dirt particles.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with an inlet flow path including an air filter as disclosed by Feigel et al. for the purpose of excluding foreign material from the cylinder.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Noltner (DE 2355728A).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that the inlet flow path includes a choke to control an impedance of the inlet flow path.

Noltner discloses that the inlet flow path includes a choke (11 and 10) for the purpose of controlling an impedance of the inlet flow path.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with an inlet flow path including a choke as disclosed by Noltner for the purpose of controlling an impedance of the inlet flow path.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Dunne et al. (U.S. Pat. No. 3,661,051).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that at least one of the outer surface of the piston extension and the inner surface of the cylinder extension is at least one of made from and coated with a low friction material.

Dunne et al. disclose that at least one of the outer surface of the piston extension and the inner surface of the cylinder extension is at least one of made from and coated with a low friction material (column 4, lines 51 to 57) for the purpose of reducing wear on the pistons.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with at least one of the outer surface of the piston extension and the inner surface of the cylinder extension made from and coated with a low friction material as disclosed by Dunne et al. for the purpose of reducing the wear on the pistons surface during operation.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li, in view of Oudet et al. and further of Carrol in view of Ball et al. (U.S. Pat. No. 5,890,460).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However,

neither Li, Oudet et al. nor Carrol disclose that the exhaust passage includes a muffler to reduce noise released from the generator.

Ball et al. disclose that the exhaust passage (1179) includes a muffler (1178) to reduce noise released from the generator for the purpose of reducing noise emitted by the engine and the generator.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with an exhaust passage including a muffler as disclosed by Ball et al. for the purpose of reducing noise released from the generator.

6. Claims 9 to 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Young (U.S. Pat. No. 4,697,113).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that the piston extension has at least one longitudinal air passage to carry air to an end of the piston adjacent the end closure, the exhaust being connected to the end closure. Neither Li, Oudet et al. nor Carrol disclose that the at least one longitudinal air passage is a longitudinal slot formed in the outer surface of the piston extension.

Young discloses that the piston extension (17) has at least one longitudinal air passage (column 5, lines 3 to 9) to carry

air to an end of the piston (17) adjacent the end closure, the exhaust being connected to the end closure. Young discloses that the at least one longitudinal air passage is a longitudinal slot formed in the outer surface of the piston extension (17). Young's invention has the purpose of keeping equal pressures between two different spaces.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with a piston extension having at least one longitudinal air passage as disclosed by Young for the purpose of keeping equal pressures between two different spaces."

Enclosed is a Rule 1.131 Affidavit swearing behind the prior art reference of Li. As is evident from the Affidavit the invention was clearly disclosed prior to the filing of the application by Li. Thus, the reference of Li is not applicable as a prior art reference. Since the Examiner used Li as the primary reference in the rejection of all of the claims, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1,2, 5-7, 11,12, and 14-21 under 35 U.S.C. 103(a) as being unpatentable over Li (US Pat. No. 5,945,749) in view of Oudet et al. (U.S. Pat. No. 5,559,378) and further in view of Carrol (U.S. Pat. No. 5,350,222).

Applicant also respectfully requests that the Examiner withdraw the rejection of claim 3 under 35 U.S.C. 103(a) as being

unpatentable over Li in view of Oudet et al. and further of Carrol in view of Fiegel et al. (U.S. Pat. No. 5,826,952).

Applicant further respectfully requests that the Examiner withdraw the rejection of claim 4 under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Noltner (DE 2355728A) and claim 8 under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Dunne et al. (U.S. Pat. No. 3,661,051).

Applicant also respectfully requests that the Examiner withdraw the rejection of claim 13 under 35 U.S.C. 103(a) as being unpatentable over Li, in view of Oudet et al. and further of Carrol in view of Ball et al. (U.S. Pat. No. 5,890,460) and claims 9 and 10 under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Young (U.S. Pat. No. 4,697,113)

In view of the Affidavit attached hereto it is believed that the invention as described in claims 1-21 is patentable and that this application is now in condition for allowance and such allowance by the Examiner is respectfully requested.

In the event the Examiner has further difficulties with the examination and/or allowance of the application, the Examiner is invited to contact the undersigned agent for applicant by telephone at (412) 380-0725, if necessary, to resolve any

remaining questions or issues by interview and/or Examiner's Amendment as to any matter.

Respectfully submitted,
James Ray and Associates

By _____
Amos Bartoli
Registration No. 42,299
Agent for Applicant

JAMES RAY & ASSOCIATES
2640 Pitcairn Road
Monroeville, PA 15146
Tel. (412) 380-0725
Fax (412) 380-0748